Gains and losses.
The same or different choices?

Arrangements (agreements, contracts, projects, etc.) are widespread economic events and are the fundamental concept of the economic theory. Infringements (breaches, modifications, changes, etc.) of arrangements are common and have a significant importance for the economic theory. For many years now the arrangement infringements have lacked appropriate attention in the economic theory. This fact caused a number of theoretical and practical problems. In order to solve them a new approach is proposed, which considers the possibility of arrangement infringements.

The approach application in relation to choosing between risky and guaranteed outcomes is discussed. The article demonstrates the approach able to give the same results for both gains and losses.

The article gives examples of practical application of the approach in relation to deposits, investments, business projects, international activities.

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1. Introduction. The approach

1.1. The arrangement. The arrangement infringement. The arrangement infringement possibility approach

In the scope of this topic**,** the basic terms will mean the following:

An arrangement will refer to an arrangement, agreement, assumption, regulation, bargain, contract, plan, project, budget, etc.

An infringement will refer to an infringement, violation, breach, modification, disturbance, deviation, change, alteration, adding, etc.

A condition will refer to a condition, term, circumstance, characteristic etc. Naturally, the term "condition" means the essential, material condition.

An arrangement infringement will refer to an infringement at least one of the arrangement conditions that take place after the decision to fulfill this arrangement was made.

An arrangement infringement possibility approach is a new approach, which considers the possibility of arrangement infringements. The results of approach applications are consistent with economic experience.

Current results of the approach are presented at www.harin.net.

The general idea of the approach is not absolutely new. In economic literature there are analogous or similar ideas (e.g. Quiggin 2005, Novarese 2002, Fioretti 2002). In economic practice there is a well-known force majeure as an example of arrangement infringements.

1.2. Nature of the approach. Approach elements as widespread economic events and fundamental concepts of economic theory

It is obvious that arrangements are widely used in economic reality. Arrangements, contracts between people, firms, firms and staff, buyers and sellers, governments and so on are examples of a wide variety of arrangements.

Since the theory tries to explain reality, there should also be the concept of arrangements in such theory. Risk, investment, insurance, micro- and macroeconomics, financial economics, financial markets, international economics, labor economics, public economics are examples of fields in economic theory where arrangements may be used and studied.

Examples of arrangement infringements may be failures of power supplies, natural disasters, sudden deterioration of health of people involved in this arrangement, criminal or terrorist interventions, dishonest behavior of people involved in this arrangement, alterations of interests of parts of this arrangement etc. The expansion of arrangement infringements is the expansion of, at least, these examples

There are theoretical and practical topics, such as insurance, which are specially connected with arrangement infringements. Moreover, all subjects of the economic theory connected with arrangements, may consider the infringements of them.

1.3. The first result of the approach

The arrangement infringement possibility approach provides an essentially new view to phenomena based on comparison of risky and guaranteed choices.

Under the condition of the exact equilibrium of mathematical expectations, any influence of non-zero value will be considerable. This argument may give rise to the general assumption: when comparing the risky and guaranteed choices in the same or almost the same conditions the possibility of an arrangement infringement should be considered.

The first result of the application and the first basic hypothesis of the approach: when a risky outcome has a high probability, arrangement infringement possibility may really reduce this probability. It can really lessen mathematical expectations (and, hence, real preferences) of such risky outcomes (or small deviations from standard ways of doing business) in comparison with the guaranteed outcomes (or standard ways of doing business).

This result may be useful, e.g., in estimating decisions of small deviations from guaranteed or well-known outcomes or ways of doing business, in predictions and planning of standard ways of doing business etc. The examples may be small deviations from a well-known style of goods or production; interventions into slightly new segments of market, banking and investment; situations with low level of risk.

2. Examples of practical application of the approach: bank deposits, investments, projects, international activities

Suppose, there is an object, a project, for money deposit or investment of money or efforts. It may be a bank, a project of investing, a business project (industry, trade, banking, public and so on), an insurance company, etc. The object is characterized by a potential gain, profit, and by low or very low level of risk.

What net profit is sufficient in order to put your money and/or efforts into this project, this object?

Due to the influence of the arrangement infringement possibility, the probability of the project success and of the profit obtaining is less than in the case there is no arrangement infringement possibility. It lessens the expected value of the project profit.

So, if there is the arrangement infringement possibility, the net profit has to be more than in case there is no such possibility (The conclusion corresponds with the well-known facts).

2.1. A project manager's point of view

Suppose, you are a project manager or a bank manager. When you estimate the real (distribution of) probability of the profit, you should lessen the probability value by the value up to the value of the probability of the arrangement infringement. Moreover, you should lessen the value of the success probability (return of the money) in the similar manner.

2.2. A depositor's, investor's, point of view

Suppose, you have got enough money to invest. "You have got money" in this case means (in a sense) the guaranty that you have got money. "You invest money in a project" means (in a sense) the risk of you losing the money. If you are a potential depositor (investor, State employee, statesman), you should assess and decide whether to deposit (to invest, to accept a public contract offer) or not. So, you should lessen the probability of the profit and return of money as if you were the project manager. Moreover, you should additionally lessen the values of the probabilities because you do not have all information the manager has.

2.3. International activities. Olympiad-like projects.

Suppose a project, which is somewhat like an Olympiad. The decision is to be made more than five years before the event. In order to obtain the right to fulfill the project, a tender has to be won. In order to win, one needs to give promises of maximum capabilities and profitability.

But during those 5 years or more there can be some unexpected circumstances, arrangement infringements, e.g. a significant terrorist threat. These arrangement infringements may cause, e.g., great increase of expenses on security. The increase may be so great that it reduces the net profit and can make the project unprofitable at all.

2.4.International activities. Millennium Dome-like projects.

Suppose a project, which is somewhat like a Millennium Dome. In other terms, imagine the development and construction of big objects and installations, especially non-standard ones.

Realization and completion of projects like these occur, as a rule, years after the decisions were taken. Over these years some unexpected circumstances may arise, e.g. new threats or increase of already known threats (terrorism). It can lead to worsening of the project's profit, as well as (functional) failures of the projects. (For example, entrances equipped with antiterrorist devices are not able to serve all visitors over the time needed for the usual functioning of the project).

2.5. General examples of arrangement infringement's origins in the field of international finance

In the field of international investing, the projects are usually rather big. Decisions under major projects are inevitably taken long before the completion of these projects. In today's ever changing world it is practically inevitable that the project compliance with the external factors on the date of its realization or date it is put into operation becomes worse compared with the project at the stage of taking the decision.

The international projects are often rather complex. That is why it is very complicated and economically inefficient to assess every option.

Often the decisions are to be made very quickly. That's why it is impossible to consider all options because there is not enough time.

Often the decision is to be developed confidentially. That's why it is impossible to consider all options (concerning more than one or few countries) because of the confidentiality.

Sometimes it is actually impossible to consider all options, in principle.

Arrangement infringements of major projects may cause problems for middle-size and small projects as well:

In relation to projects being the part of major ones.

In relation to projects connected with the major ones by contracts.

In relation to projects implicitly depending on success of the major ones.

3. The experiments of both gain and loss

3.1. The general problem

Choosing between guaranteed and risky choices is one of the important economic theory problems. There is numerous literature devoted to this topic (e.g. "a brief overview of the "state of the art" in the theory of rational decision making since the 1950's" in Egidi 2005). The examples of this problem are Allais paradox, risk aversion, equity premium puzzle etc. (e.g. Allais 1953, Allard et al 2003, Goetzmann and Ibbotson 2005). The essential part of this problem is the comparison of choices in cases of gains and losses.

3.2. Description of the experiments arrangement

Suppose two simplest experiments representing the features of both gains and losses:

First. Suppose Somebody offers you to choose just one of the following:

1A) A guaranteed gain of 99$.

Or

1B) A lottery:

1B1) the gain of 100$ with the probability 99%

and

1B2) 0$ with the probability 1%.

(For the experiment accuracy, both 99$ and 100$ should be in 1$ banknotes. So 99 and 100 banknotes of 1$)

Second. Suppose you are to choose just one of the following:

2A) A guaranteed loss of 99$.

Or

2B) A lottery:

2B1) the loss of 100$ with the probability 99%

and

2B2) 0$ with the probability 1%.

3.3. The results of the experiment

The mathematical expectations of outcomes A and B in every experiment are exactly the same. But it is not the common choice of people:

In general, a well-determined experimental fact (e.g., Tversky and Wakker 1995) is: at high probabilities, guaranteed gains are more attractive than risky ones. In experiments similar to the first one, the obvious majority of people chose the guaranteed gain instead of the lottery one.

Moreover, the next well-determined experimental fact (e.g., Di Mauro and Maffioletti 2004) is: at high probabilities, guaranteed losses are less attractive than risky ones.

Harina et al (2001) performed the series of experiments, a part of which are almost identical to the one considered above. The series covered more than half-thousand people. Those experiments argued in favour of the first hypothesis of the approach. In the experiments the overwhelming majority of people undoubtedly preferred the guaranteed gains and the lottery losses.

3.4. The contrary choices

So, when comparing the cases of gains and losses at high probabilities, the common choices are, in some sense, contrary to each other:

In cases of gains - people do not like risk.

In cases of losses - people like risk.

The choices are contrary.

4. The explanation of the experiments

As it was shown in Harin (2005), taking into account an arrangement infringement possibility provides an essentially new approach to comparison of risky and guaranteed choices.

4.1. The nature of arrangement infringements. The space of "Anything can happen"

The precise analysis of such situations that include the consideration of arrangement infringements is rather complicated (if it is possible at all). One of the reasons of this complexity consists in the following:

When we consider arrangement infringements, the (mathematical) space of outcomes comes from the space of two (or few) discrete outcomes to the space of indefinitely large number of outcomes. Indeed, if we accept a possibility of arrangement infringements then we enter the situation where anything can happen and space of "Anything can happen". The statement "The probabilities of arrangement infringements can be very small" do not simplify the consideration.

Due to such reasons, in the situation when arrangement infringements are considered, a hypothesis, assumption or test model is often more pertinent then a try to give an exact proof.

4.2. Risky and guaranteed outcomes

If an experiment arrangement can be infringed, modified, the characteristics of the outcomes of this experiment can be modified as well. So, the probabilities of outcomes can be modified. What probability can be modified to the greater extent? The probability of guaranteed or that of risky outcome? One of considerations may include in the following:

Suppose the probability of a guaranteed outcome is modified. If the value of the modification is nonzero, this outcome will modify its nature.

Suppose the probability of a risky outcome is modified. If the modified probability does not equal one or zero, the outcome doesn't modify its nature.

Therefore, the probability of a risky outcome will be modified to the greater extent than that of the guaranteed one.

Another reason is: the responsibility for the arrangement infringement in the guaranteed case is greater than in the case of lottery.

4.3. The general sign of influence

How can an arrangement infringement possibility influence the experiment in general?

For example, we may consider one or two (main) outcomes, whether gains (positive) or losses (negative), having the probabilities 100% or about 100%. Presuppose the following:

There are arrangement infringements having total nonzero finite probability. The arrangement infringements can lead to additional outcomes. The number of these additional outcomes is greater than the number of the main outcomes. In the scope of arrangement infringements total probability, the distribution of the main and additional outcomes is very approximately equal to each other.

In the scope of such example and presuppositions it is obvious that the arrangement infringements will decrease the possibilities of (main) outcomes, whether gains or losses.

Others considerations may be accomplished giving the same or similar results.

4.4. The gain. The loss. The choices can be the same

Let us consider and compare the modifications of the experiments outcomes probabilities and the modifications of the corresponding mathematical expectations. The arrangement infringements may decrease the probabilities of outcomes, whether gains or losses. The probability of the lottery may be reduced in comparison with the probability of the guarantee. The absolute values of the mathematical expectations in the case of the guarantee will be higher than those in the case of the lottery.

The gain. The values of the mathematical expectations are positive. The mathematical expectation in the case of the guarantee will be higher than that in the case of the lottery.

The mathematical expectation in the case of the guarantee will be the best.

The loss. The values of the mathematical expectations are negative. The mathematical expectation (not an absolute value) in the case of the guarantee will be less than in the case of the lottery.

The mathematical expectation in the case of the lottery will be the best.

So, in the scope of such example and presuppositions, peoples prefer the best mathematical expectations (the best expected values) in the cases of gains as well as in the cases of losses.

The choices can be the same.

Conclusions

Arrangements (agreements, contracts, regulations, bargains, etc.) are widespread economic events and are the fundamental concept of the economic theory. Infringements (breaches, modifications, deviations, changes, etc.) of arrangements are common and have a significant importance for the economic theory. For many years now the arrangement infringements have lacked appropriate attention in the economic theory. This fact caused a number of theoretical and practical problems. In order to solve them a new approach is proposed, which considers the possibility of arrangement infringements.

The approach application in relation to choosing between risky and guaranteed outcomes is discussed. The concept of the space of "Anything can happen" is introduced. The article demonstrates the approach able to give the same results for both gains and losses.

The article gives examples of practical application of the approach in relation to bank deposits, investments, business projects and international activities such as Millennium Dome-like projects and Olympiad-like projects.

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